

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:

Chimitt et al.

Application No.: 10/706,345

Confirmation No.: 6037

Our File: TN313.US

Filed: November 12, 2003

For: METHOD AND SYSTEM FOR
PROCESSING INPUT/OUTPUT
REQUESTS DIRECTED TO A
VIRTUAL DATA VOLUME

Group: 2182

Examiner: Ilwoo Park

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an Appeal Brief being submitted by applicant in response to the Notice of Appeal filed by the Applicants on November 11, 2009. The Notice of Appeal was filed in response to a Final Office Action mail June 9, 2009.

Applicants requested a Pre-Brief Appeal Conference when the Notice of Appeal was filed. On January 5, 2010, the Conference decided that the Appeal should proceed to the Board of Patent Appeals.

Applicant: Chimitt et al.
Application No.: 10/706,345

Real Party in Interest

Unisys Corporation

Related Appeals and Interferences

None

Status of Claims

The status of claims in this application is as follows:

Claims 1-5, 7, 9, 11-12, 14-16, and 18-25 are currently pending in this application. All of these claims have been finally rejected by the Examiner, and all are being appealed. (See attached Appendix of Appealed Claims).

Claims 1, 2, 4, 5, 7-9, 11-14, 16, and 18-25 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2003/0158836 to Venkatesh et al. (hereinafter "Venkatesh").

Claims 3 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al. [US 2003/0158836 A 1] in view of well known in the art.

Status of Amendments

An AMENDMENT was filed by Applicant on March 2, 2009 containing previously amended claims 1-5, 7, 9, 11-12, 14-16, and 18-25 for the purpose of arguing as to the patentability of the claims so as to thereby overcome the Examiner's rejections under 35 U.S.C. 112, second paragraph. IN the Final Office Action of June 9, 2009, the Examiner maintained this rejection.

In the March 2, 2009 Amendment, the Applicants argued as to the patentability of the claims over the teaching of U.S. Patent Application Publication No. 2003/0158836 to Venkatesh et al. The Examiner also maintained his rejection of claims 1, 2, 4, 5, 7-9, 11-14, 16, and 18-25 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2003/0158836 to Venkatesh et al. (hereinafter "Venkatesh").

Finally the Examiner also maintained his rejection of Claims 3 and 15 under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al. [US 2003/0158836 A 1] in view of well known in the art.

The applicants responded to the Final Rejection with the filing of a Notice of Appeal filed on November 11, 2009. The Notice of Appeal was filed in response to a Final Office Action mail June 9, 2009.

Applicants requested a Pre-Brief Appeal Conference when the Notice of Appeal was filed. On January 5, 2010, the Conference decided that the Appeal should proceed to the Board of Patent Appeals.

Summary of Claimed Subject Matter

Claim 1 is directed to a method for processing input/output request packets (IRPs) directed to a Data Volume (Figs 4-8, 130, 160) for providing a single logical storage device (Fig. 3, 56) to users and applications (Fig 3, 52) of a computing system (Fig 3, 50). The Data Volume (Figs 4-8, 130, 160) having a meta-data extent and at least one data extent. The meta-data extent (Fig. 8 180) and at least one data extent (fig. 8, 182) are Basic Volumes (Fig 3, 56). The method is implemented above as a Basic Volume Manager (Fig 9, 210).

The method comprising the steps of intercepting an initial IRP before the IRP reaches a file system associated with the IRP (Figs. 9-10); evaluating the IRP by a first volume filter (Fig. 9, 204) associated with the meta-data extent (Fig. 8 180) to determine the meta-data extent (Fig. 8 180) to handle the IRP; directing the IRP by the first volume filter (Fig. 9 204) to the appropriate meta-data extent (Fig. 9, 202); redirecting the IRP from the meta-data extent (Fig. 9, 202) to a second volume filter (Fig. 9, 204) associated with the at least one data extent associated with the meta-data extent (Fig. 9, 212); and returning a response to the initial IRP from the second

volume filter (Fig. 9, 204) associated with the at least one data extent (Fig. 9, 212). The meta-data extent (Fig. 8, 180) is a first logical drive (Fig. 8, 181) and the at least one data extent is a second logical drive (Fig. 8, 190). The Data Volume (Figs 4-8, 130, 160) appears as a single storage volume (Fig. 10) to the users and the applications. The meta-data extent comprises configuration information for use in setting up and maintaining the Data Volumes.

Claim 9 is directed to a method for storing data across at least one physical disk (Fig. 4, 100) and presenting the data as a single virtual disk (Fig. 10). The method comprises the steps of intercepting a first input/output request packet (IRP) from an originator of I/O before the IRP reaches a file system associated with the IRP; forwarding the first IRP to a first volume filter (Fig. 9 204) associated with the meta-data extent (Fig. 8, 180); creating an additional IRP by the first volume filter (Fig. 9 204) for each data extent (Fig. 9, 212) affected by the first IRP; transmitting each additional IRP to a second volume filter (Fig. 9 204) associated with each data extent (Fig. 9, 212) affected by the first IRP; allowing each additional IRP to pass through the second volume filter (Fig. 9 204) associated with volume filter (Fig. 9 204) of each data extent (Fig. 9, 212) affected by the first IRP; and returning a response to the first IRP from each second volume filter (Fig. 9 204) associated with the at least one data extent (Fig. 9, 212) originator of I/O.

Claim 14 is directed to a computer system for providing a single Data Volume of data storage to users and applications of the computing system. The system is constructed with a plurality of storage clients connected to at least one storage server across a computer network; a plurality of magnetic disks wherein Data Volumes (Figs 4-8, 130, 160) may be created and virtually presented to said storage clients (Fig. 3, 52), each of said Data Volumes (Figs 4-8, 130, 160) having a meta-data extent (Fig. 8, 180, Fig. 9, 202) and at least one data extent (Fig. 9, 212), the meta-data extent (Fig. 8, 180, Fig. 9, 202) including a first volume filter adapted to intercept and redirect input/output request packets (IRPs) received from one of the storage clients (Fig. 3, 52), before the IRP is received by an associated file system, to a second volume filter (Fig. 9, 204) associated with the at least one data extent (Fig. 9, 212), said first volume filter configured to create an additional IRP for each data extent (Fig. 9, 212) affected by the IRP; the second volume filter (Fig. 9, 204) associated with each of the at least one data extent (Fig. 9, 212) returns a response to the IRP, and wherein the first and second volume filters are implemented above a Basic Volume Manager (Fig 9, 210); and a central management facility for controlling the at least one storage server. The meta-data extent (Fig. 8, 180, Fig. 9, 202) is a first logical drive and the at least one data extent (Fig. 9, 212) is a second logical drive. The Data Volume (Figs 4-8, 130, 160) appears as a single storage volume to the users and the applications. The meta-data extent (Fig. 8, 180, Fig. 9,

202) comprises configuration information for use in setting up and maintaining the Data Volume (Figs 4-8, 130, 160).

Grounds of Rejection to be Reviewed on Appeal

Rejection of claims 1-5, 7, 9, 11-12, 14-16, and 18-25 are currently pending in this application.

Rejection of claims 1, 2, 4, 5, 7-9, 11-14, 16, and 18-25 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2003/0158836 to Venkatesh et al. (hereinafter "Venkatesh").

Rejection of claims 3 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al. [US 2003/0158836 A 1] in view of well known in the art.

ARGUMENT

Initially, the applicable law with respect to a 35 U.S.C. 102 rejection will be briefly summarized.

It is well established that "A claim is anticipated under 35 U.S.C. only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. V. Union Oil Co. of

California, 814 F.2d 628, 631 2 USPQ2d 1050, 1053 (Fed. Cir. 1987) (see also MPEP 2131). (Underlining provided for added emphasis).

Additionally, as held in the CAFC decision, Trintec Industries, Inc. v. Top-U.S.A. Corp. (CAFC 7/2/02), “Inherent anticipation requires that the missing descriptive material is ‘necessarily present,’ not merely probably or possibly present, in the prior art.” In re Robertson, 169, F.3d 743, 45 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).

Still further, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijakaert, 9F.3d, 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). “In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teaching of the applied prior art. Ex parte Levy, 17 USPQ2d 1461 1464 (Bd. Pat. Ap. & Inter. 1990) (emphasis in original). (Also see MPEP 2112).

Additionally, note the recent CAFC decision Elan Pharmaceuticals v. Mayo Foundation for Medical Education and Research, 68 USPQ2d 1373 (CAFC, Oct. 2, 2003) which holds that: “The disclosure in an anticipating reference must be

adequate to enable the desired subject matter. It is insufficient to name or describe the desired subject matter, if it cannot be produced without undue experimentation.”

The Examiner’s rejections of claims 1, 2, 4, 5, 7-9, 11-14, 16, and 18-25 will now be more specifically considered.

Claim Rejections - 35 USC §112

Claims 1, 2, 4, 5, 7-9, 11-14, 16, and 18-25 stand rejected under 35 U.S.C. §112 as failing to comply with the written description requirement. The Examiner asserts this rejection by reciting that “[t]he Specification does not include “before the IRP reaches a file system associated with the IRP.” See Office Action in ¶ 4 at p. 2.

The Applicant respectfully points the Examiner to the following paragraph on p. 7 of the Specification:

It is important to note that the volume filter preferably is software written specifically to implement the present invention i.e., logically combine Basic Volumes, referred to as extents, so that any number of Basic Volumes possibly located on separate disks may appear and be presented to users as a single Data Volume, as explained herein. As mentioned, the volume filter is conceptually above the Basic Volumes so that IRPs are processed by the volume filter **prior to being processed** by the Basic Volume Manager. The volume filter is incorporated into the operating system and only the I/O manager is aware that it is there. That is, I/O originators think they are talking to a single Basic Volume and are not aware that their I/O may be redirected according to the logic of a particular Data Volume.

(Emphasis Added).

The Applicants maintain that processing the IRP BEFORE REACHING A FILE SYSTEM to be described when the IRP is processed PRIOR to being processed by the Basic Volume Manager. As such, the rejection is improper.

Claim Rejections - 35 USC §102(e)

Claims 1, 2, 4, 5, 7-9, 11-14, 16, and 18-25 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2003/0158836 to Venkatesh et al. (hereinafter “Venkatesh”).

Claim 1, which is representative of the independent claims 9, 14, and 23, recites intercepting an initial IRP before the IRP reaches a file system associated with the IRP and implementing the method above a Basic Volume Manager.

The Examiner interprets the “volume filter” of claim 1 as a “data mover” in Venkatesh. Applicants respectfully disagree for the following reasons. To intercept an IRP before it is received by an associated file system and to implement the volume filter above a Basic Volume Manager, the volume filter would need to be implemented outside of the native operating system. For example, the volume filter could be implemented as a driver and would need to communicate to the operating system through some mechanism like an I/O manager.

Venkatesh's data movers are computers (paragraph 0054; "Each of the data movers 115, 116, 117 is a high-end commodity computer") implemented as part of a distributed network's file server (paragraph 0010, Figure 9). The claimed volume filters are distinguishable from the data movers of Venkatesh, in that a high-end commodity computer could not be implemented above a Basic Volume Manager, nor could it intercept an input/output request packet before it is received by the associated file system. Figure 9 illustrates that the file system (144) is part of the data mover (115). The data mover cannot act independently of the file system in Figure 9, and therefore cannot perform the functions of the claimed volume filters. Even if it were interpreted that software implemented and replicated on each data mover computer of Venkatesh was equivalent to the claimed volume filter, Venkatesh recites that a request is forwarded to the data mover from the meta file system manager.

Software implemented in Venkatesh's data movers does not intercept IRPs before they are received by the associated file system. Venkatesh describes three file systems, and their respective relation to the meta file system manager. In paragraph 0061, describing the network file system (NFS), a client makes a request for access to a file.

“A client first issues an NFS lookup request including a path to a file and the filename for the file to be accessed. The lookup request returns a file handle for a file entry corresponding to the file. The client uses the file handle in subsequent requests for access to the file. These subsequent request are interpreted by the NFS routines 141 and forwarded to the meta file system manager 146.” (emphasis added).

Clearly, the NFS accesses the request before the meta file system manager.

Paragraph 0062 describes the operation under the Common Internet File System (CIFS). “The CIFS server routines 142 receive the CIFS request from the client and forward the request through the Virtual File System (VFS) to the meta file system manager 146.” Again, the CIFS accesses the request before the meta file system manager and the VFS. A similar scenario describing the UNIX file system (UxFS) is described in paragraph 0074.

Venkatesh does not disclose a volume filter as claimed. Venkatesh does not disclose intercepting an input/output request packet before it reaches the associated file system. Venkatesh does not disclose implementing a meta file system above a Basic Volume Manager as claimed. Therefore, claim 1 is patentable over Venkatesh for the reasons presented above.

The Applicants made these arguments in the prior Amendment in response to an Office Action. In the Action dated September 29, 2008, the Examiner restates these same rejections and then fails to respond to the Applicants’ arguments in any

way. The Applicants do not understand how the Examiner expects them to respond to these rejections when the Examiner has not stated anything more than what was stated before. In the MPEP § 706.07, the Examiner is instructed as follows:

Before final rejection is in order a clear issue should be developed between the examiner and applicant. To bring the prosecution to as speedy conclusion as possible and at the same time to deal justly by both the applicant and the public, the invention as disclosed and claimed should be thoroughly searched in the first action and the references fully applied; and in reply to this action the applicant should amend with a view to avoiding all the grounds of rejection and objection. Switching from one subject matter to another in the claims presented by applicant in successive amendments, or from one set of references to another by the examiner in rejecting in successive actions claims of substantially the same subject matter, will alike tend to defeat attaining the goal of reaching a clearly defined issue for an early termination, i.e., either an allowance of the application or a final rejection.

While the rules no longer give to an applicant the right to "amend as often as the examiner presents new references or reasons for rejection," present practice does not sanction hasty and ill-considered final rejections. The applicant who is seeking to define his or her invention in claims that will give him or her the patent protection to which he or she is justly entitled should receive the cooperation of the examiner to that end, and not be prematurely cut off in the prosecution of his or her application. But the applicant who dallies in the prosecution of his or her application, resorting to technical or other obvious subterfuges in order to keep the application pending before the primary examiner, can no longer find a refuge in the rules to ward off a final rejection.

The examiner should never lose sight of the fact that in every case the applicant is entitled to a full and fair hearing, and that a clear issue between applicant and examiner should be developed, if possible, before appeal. However, it is to the interest of the applicants as a class as well as to that of the public that prosecution of an application be confined to as few actions as is consistent with a thorough consideration of its merits.

Neither the statutes nor the Rules of Practice confer any right on an applicant to an extended prosecution; *Ex parte Hoogendam*, 1939 C.D. 3, 499 O.G.3, 40 USPQ 389 (Comm'r Pat. 1939).

STATEMENT OF GROUNDS

In making the final rejection, all outstanding grounds of rejection of record should be carefully reviewed, and any such grounds relied on in the final rejection should be reiterated. They must also be clearly developed to such an extent that applicant may readily judge the advisability of an appeal unless a single previous Office action contains a complete statement supporting the rejection.

However, where a single previous Office action contains a complete statement of a ground of rejection, the final rejection may refer to such a statement and **also should include a rebuttal of any arguments** raised in the applicant's reply. If appeal is taken in such a case, the examiner's answer should contain a complete statement of the examiner's position. The final rejection letter should conclude with Form Paragraph 7.39.
(Emphasis added).

The Applicants respectfully request that the Examiner provide a proper response to the Applicants' arguments to permit Applicants to respond in a matter that either moves the issues forward and/or properly frames the issue for an appeal.

Claims 2, 4, 7, 9, 11, 12, 16, 18-22, 24, and 25 are dependent upon claims 1, 9, 14, and 23, respectively, which the Applicants believe are allowable over the cited references for the same reasons provided above.

Based on the arguments presented above, withdrawal of the 35 U.S.C. §102(e) rejection of claims 1, 2, 4, 5, 7, 9, 11, 12, 14, 16, and 18-25 is respectfully requested.

Claim Rejections - 35 USC §103

Claims 3 and 15 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Venkatesh in view of well known art.

Claims 3 and 15 are dependent upon claims 1 and 14, respectively, which the Applicants believe are allowable over the cited references for the same reasons provided above.

Once again, In the Action dated September 29, 2008, the Examiner restated these same rejections and then fails to respond to the Applicants' arguments in any way. The Applicants do not understand how the Examiner expects them to respond to these rejections when the Examiner has not stated anything more than what was stated before. The Applicants again respectfully request that the Examiner provide a proper response to the Applicants' arguments to permit Applicants to respond in a matter that either moves the issues forward and/or properly frames the issue for an appeal.

Based on the arguments presented above, reversal of the 35 U.S.C. §103(a) rejection of claims 3 and 15 is respectfully requested.

Conclusion

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In view of all of the foregoing, Applicant respectfully submits that the
Examiner's rejections of claims 28-37 are in error.

Reversal thereof is accordingly respectfully solicited.

Respectfully submitted,

Chimitt et al.

Date: July 8, 2010

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APPENDIX OF APPEALED CLAIMS

1. (Previously Presented) A method for processing input/output request packets (IRPs) directed to a Data Volume for providing a single logical storage device to users and applications of a computing system, the Data Volume having a meta-data extent and at least one data extent, wherein the meta-data extent and at least one data extent are Basic Volumes, and the method is implemented above a Basic Volume Manager, the method comprising the steps of:

intercepting an initial IRP before the IRP reaches a file system associated with the IRP;

evaluating the IRP by a first volume filter associated with the meta-data extent to determine the meta-data extent to handle the IRP;

directing the IRP by the first volume filter to the appropriate meta-data extent;

redirecting the IRP from the meta-data extent to a second volume filter associated with the at least one data extent associated with the meta-data extent;

returning a response to the initial IRP from the second volume filter associated with the at least one data extent;

wherein the meta-data extent is a first logical drive and the at least one data extent is a second logical drive;

the Data Volume appears as a single storage volume to the users and the applications; and

the meta-data extent comprises configuration information for use in setting up and maintaining the Data Volumes.

2. (Original) The method of claim 1 wherein the IRP is initiated by an originator of input/output (I/O).

3. (Original) The method of claim 2 wherein the originator of I/O is a Small Computer System Interface Target Mode Driver (SCSITMD).

4. (Original) The method of claim 1 wherein the meta-data extent is associated with a plurality of data extents.

5. (Original) The method of claim 4 wherein the plurality of data extents are located on a plurality of physical disks.

6. (Canceled)

7. (Previously presented) The method of claim 1 wherein the redirecting step includes creating additional IRPs by the volume filter, each

additional IRP being derived from the initiated IRP and relating to a single data extent.

8. (Canceled)

9. (Previously presented) A method for storing data across at least one physical disk and presenting the data as a single virtual disk comprising the steps of:

intercepting a first input/output request packet (IRP) from an originator of I/O before the IRP reaches a file system associated with the IRP ;

forwarding the first IRP to a first volume filter associated with the meta-data extent;

creating an additional IRP by the first volume filter for each data extent affected by the first IRP;

transmitting each additional IRP to a second volume filter associated with each data extent affected by the first IRP;

allowing each additional IRP to pass through the second volume filter associated with volume filter of each data extent affected by the first IRP; and

returning a response to the first IRP from each second volume filter associated with the at least one data extent originator of I/O.

10. (Canceled)

11. (Previously Presented) The method of claim 9 wherein the data extents are located on separate physical disks.

12. (Previously Presented) The method of claim 9 wherein the data extents affected by the first IRP are located on separate physical disks.

13. (Canceled)

14. (Previously presented) A computer system for providing a single Data Volume of data storage to users and applications of the computing system, the system comprising:

a plurality of storage clients connected to at least one storage server across a computer network;

a plurality of magnetic disks wherein Data Volumes may be created and virtually presented to said storage clients, each of said Data Volumes having a meta-data extent and at least one data extent, the meta-data extent including a first volume filter adapted to intercept and redirect input/output request packets

(IRPs) received from one of the storage clients, before the IRP is received by an associated file system, to a second volume filter associated with the at least one data extent, said first volume filter configured to create an additional IRP for each data extent affected by the IRP; the second volume filter associated with each of the at least one data extent returns a response to the IRP, and wherein the first and second volume filters are implemented above a Basic Volume Manager; and

a central management facility for controlling the at least one storage server;

wherein the meta-data extent is a first logical drive and the at least one data extent is a second logical drive;

the Data Volume appears as a single storage volume to the users and the applications; and

the meta-data extent comprises configuration information for use in setting up and maintaining the Data Volume.

15. (Original) The computer system of claim 14 wherein the computer network is a fibre channel network.

16. (Original) The computer system of claim 14 wherein each storage client is presented with a virtual disk including at least one Data Volume having a meta-data extent and at least one data extent.

17. (Canceled)

18. (Previously presented) The computer system of claim 14 wherein the at least one data extent is a plurality of data extents and the IRPs are redirected to the data extents based on which data extents are affected by the IRPs.

19. (Original) The computer system of claim 14 wherein each storage client is presented with a particular Data Volume including a meta-data extent and at least one data extent.

20. (Original) The computer system of claim 19 wherein the Data Volume is a simple volume.

21. (Original) The computer system of claim 19 wherein the Data Volume is a spanned volume.

22. (Original) The computer system of claim 21 wherein the Data Volume includes at least three Basic Volumes and a volume filter is logically disposed above said Basic Volumes.

23. (Previously presented) A volume filter for redirecting input/output request packets (IRPs) sent from an input/output (I/O) originator, the volume filter comprising:

intercepting means for intercepting IRPs sent to a meta-data extent associated with a Basic Volume before the IRP is received by an associated file system;

evaluating means for evaluating IRPs to determine a meta-data extent to handle the IRP;

redirecting means for redirecting the IRPs to at least one data extent associated with at least one other Basic Volume wherein a plurality of data extents are associated with an equal number of Basic Volumes; and

creating means for creating an additional IRP for each data extent affected by a redirected IRP;

wherein the meta-data extent is a first logical drive and the at least one data extent is a second logical drive;

the Data Volume appears as a single storage volume to the users and the applications; and

the meta-data extent comprises configuration information for use in setting up and maintaining the Data Volume.

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24. (Original) The volume filter of claim 23 wherein the plurality of data extents includes data extents located on separate physical disks.

25. (Original) The volume filter of claim 24 wherein the volume filter is logically disposed above the Basic Volumes.

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Related Proceedings Appendix

None

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Evidence Appendix

None